UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 69536

TWP NO. 415

OVER THE

CHANNEL AT LAKE VERMILLION

DISTRICT 1 - ST. LOUIS COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 12)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 69536, Piers 1 and, 2 were found to be in good condition with no defects of structural significance observed. Since the previous inspection, the deterioration on the steel pipe piles has increased, however, there was still no appreciable loss of original section of integrity. The channel bottom appeared to be stable with no evidence of significant scour or appreciable changes since the previous inspection.

INSPECTION FINDINGS:

(A) The steel pipe piles exhibited 50 to 100 percent coating failure and surface corrosion from 6 inches above the waterline to 6 inches below the waterline.

(B) The steel pipe piles exhibited 50 to 75 percent coating failure with heavy nodular corrosion, with nodules that were 1 to 1.5 inches in diameter and with typical pitting of 1/32 inch in depth and up to 1/16 inch deep, from 6 inches below the waterline to the channel bottom.

RECOMMENDATIONS:

(A) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 69536

Feature Crossed: Channel at Lake Vermillion

Feature Carried: TWP No. 415

Location: District 1 - St. Louis County

Bridge Description: The superstructure is a three span, multiple prestressed concrete girder bridge supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two steel shell pile bent piers. The abutments are founded on spread footings keyed into bedrock. The piers are numbered 1 and 2 starting from the west end of the bridge.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg
State of Minnesota, P.E., No. 21491

Dive Team: Michelle D. Koerbel, Matthew J. Lengyel

Date: August 29, 2002

Weather Conditions: Cloudy, ± 65^{o} F

Underwater Visibility: ± 3.0 Feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: Rectangular reinforced concrete pile cap with rounded ends supported by four concrete-filled steel shell piles.

Maximum Water Depth at Substructure Inspected: Approximately 5.0 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the south side of Pier 1.

Water Surface: The waterline was approximately 8.3 feet below reference. Assumed Waterline Elevation = 91.7.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

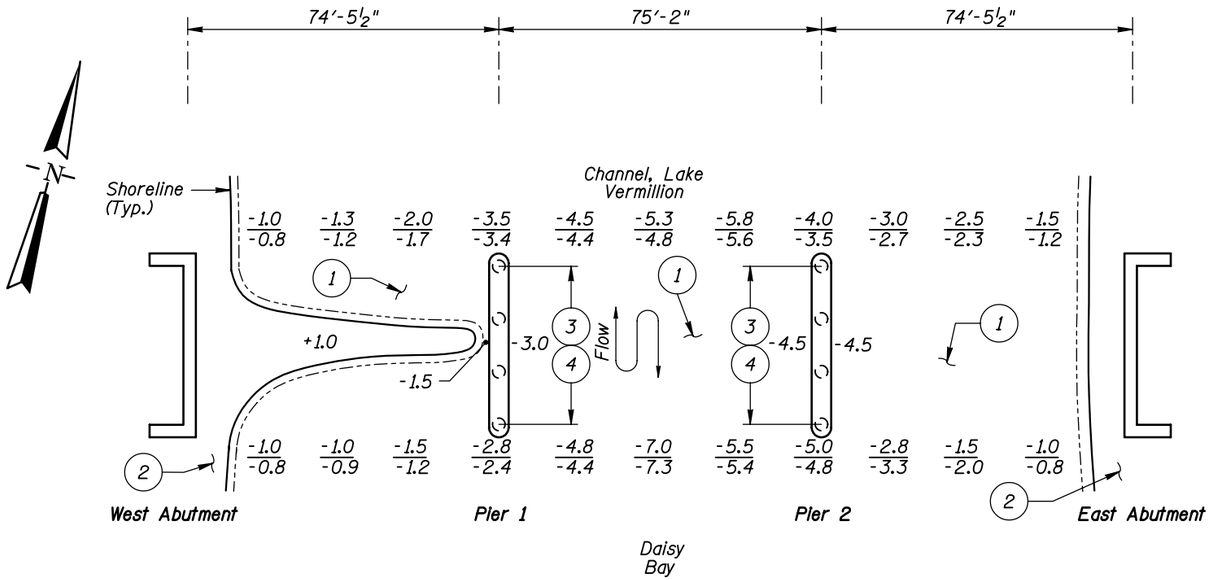
Item 61: Channel and Channel Protection: Code 8

Item 92B: Underwater Inspection: Code B/08/02

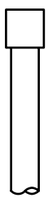
Item 113: Scour Critical Bridges: Code I/92

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____ Yes __X__ No



SOUNDING PLAN



TYPICAL END VIEW OF PIERS

GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on August 29, 2002, the waterline was located approximately 8.3 feet below the top of the cap at the south end of Pier 1. Since insufficient bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 91.7.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

(1) The channel bottom material typically consisted of firm sand with scattered riprap up to 18 inches in diameter and a maximum probe rod penetration of 1 to 3 inches.

(2) Both shorelines were well protected with 12 to 36 inch diameter riprap material along the banks.

(3) The steel pipe piles exhibited 50 to 100 percent coating failure and surface corrosion from 6 inches above the waterline to 6 inches below the waterline.

(4) The steel pipe piles exhibited 50 to 75 percent coating failure from 6 inches below the waterline to the channel bottom with heavy nodular corrosion, ranging in size from 1 to 1.5 inches in diameter. Rust nodules exhibited typical pitting of 1/32 inches in depth and up to 1/16 inches deep.

Legend

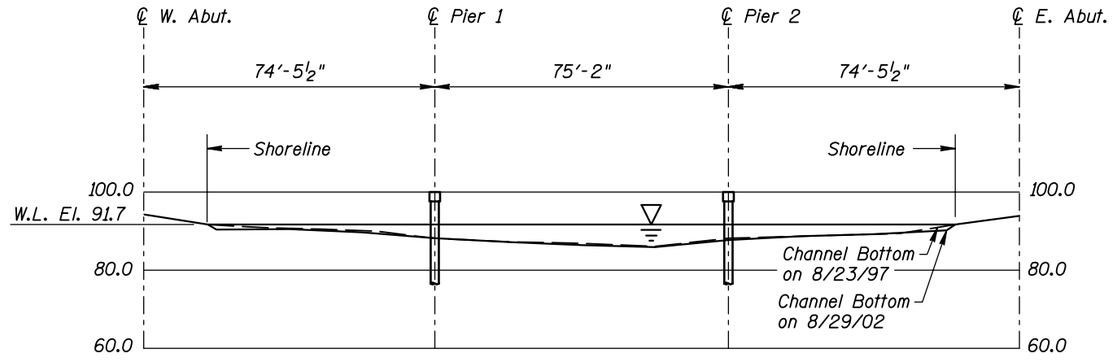
-4.0 / -3.5	Sounding Depth from Waterline (8/29/02) / Sounding Depth from Waterline (8/23/97)
◯	Concrete Filled Steel Pipe Pile

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

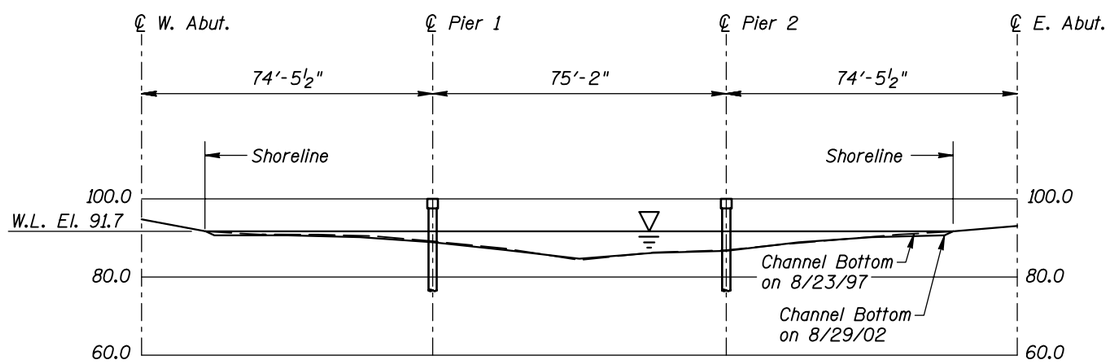
STRUCTURE NO. 69536
OVER THE CHANNEL, LAKE VERMILLION
DISTRICT 1, ST. LOUIS COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120012		Figure No.: 1



NORTH FASCIA PROFILE



SOUTH FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

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DISTRICT 1, ST. LOUIS COUNTY

NORTH AND SOUTH
FASCIA PROFILES

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: 1"=40'
Code: 35120012		Figure No.: 2

Photograph 1. Overall View of Structure, Looking South.

Photograph 2. View of Pier 1, Looking Northeast.

Photograph 3. View of Pier 2, Looking Northeast.

Photograph 4. View of Typical Corrosion of the Steel Pipe Piles, Looking Northeast.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: August 29, 2002
ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E.
BRIDGE NO: 69536 WEATHER: Cloudy, "65^{o} F
WATERWAY CROSSED: Channel at Lake Vermillion
DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
OTHER
PERSONNEL: Michelle D. Koerbel, Matthew J. Lengyel
EQUIPMENT: Scuba, U/W Light, Scraper, Lead Line, Probe Rod, Camera
TIME IN WATER: 9:10 A.M.
TIME OUT OF WATER: 9:40 A.M.
WATERWAY DATA: VELOCITY Negligible/None
VISIBILITY " 3.0 feet
DEPTH 5.0 feet maximum at Pier 2
ELEMENTS INSPECTED: Piers 1 and 2
REMARKS: Overall, the steel pipe piles were in good condition with 50 to 100 percent coating failure at the surface and 50 to 75 percent coating failure below water, with heavy nodular corrosion having nodules ranging from 1 to 1 .5 inches in diameter. There was pitting beneath the nodular corrosion with 1/32 typical to 1/16 inch maximum penetration.

FURTHER ACTION NEEDED: _____ YES ___X___ NO

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 69536
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E. 21491
WATERWAY CROSSED Channel, Lake Vermillion

INSPECTION DATE August 29, 2002

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (BRACING)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	3.5’	7	N	N	9	N	7	8	N	8	N	8	N	7	N	7	N	N
	Pier 2	5.0’	7	N	N	9	N	7	8	N	8	N	8	N	7	N	7	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the steel pipe piles were in good condition with 50 to 100 percent coating failure at the surface and 50 to 75 percent coating failure below water, with heavy nodular corrosion having nodules ranging from 1 to 1 .5 inches in diameter. There was pitting beneath the nodular corrosion with 1/32 typical to 1/16 inch maximum penetration.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.